

PERCEIVED LEVEL OF COMPETENCE OF THE UNIVERSITY STUDENTS' PROBLEM-SOLVING SKILLS IN MATHEMATICS IN THE NEW NORMAL

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1. ABSTRACT

The emergence of the pandemic has led to the shift of the educational set up of schools and universities in which level of competence in problem-solving skills in mathematics must be perceived so that students can overcome problems met. This study aimed to determine Bachelor of Secondary Education Major in Mathematics students' perceived competence in problem-solving skills in mathematics in the new normal for the academic year 2020-2021 of Cebu Technological University-Argao Campus. The six (6) problem-solving skills, namely: creative thinking, analysis, decision making, emotional intelligence, researching skills, and team working as well as the problem they encountered, were investigated.

This study utilized a descriptive-quantitative research design and employed an adapted questionnaire from Problem-solving Style Questionnaire by Ranganath Pandit (2011), Mathematical problem-solving strategies among student teachers by Melanie Guzman Gurat (2018), Mathematical problem-solving skills using IDEAL model based on personality type by Setyadi et al. (2019), and Perception of Blended Learning in an EFL Setting by Ersin Balci (2017). The findings of the study revealed that students showed competence in problem solving skills along with the different areas and were flexible enough in learning mathematics despite the changes of the learning set up and the difficulties they have encountered in online mathematics learning.

KEYWORDS: *Problem Solving, Creative Thinking, Analysis, Decision Making, Emotional Intelligence, Researching Skills, Team-Working, Online learning*

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2. INTRODUCTION

One of the most recent global public health emergencies is the Corona Virus 2019 pandemic which has brought pressing and sudden challenges and has affected the entire economy, especially the educational sectors. The COVID-19 pandemic is a positive disruptor, offering an opportunity to reconstruct the existing traditional educational scheme based on classrooms. The changes to the online mode helped preserve the continuity of the learning process in which teachers use various online modalities to meet the students' educational needs have paved the way to adapt to the new normal.

Several schools have adapted and shifted to blended learning and online education. As a result, various research studies have been conducted on quality online learning, online teaching, online course structure, and online learning benefits from well-prepared design and preparation of instruction, using a structured design and planning model. Blended learning is where the learners learn via electronic and online media and classical face-to-face, while pure online learning, learners will have access and passage to their education through e-learning, which will include synchronous and asynchronous classes (Teach Thought Staff, 2012).

Learning in the middle of a health crisis is pivotal for both the learners and the teachers. The most affected part of this new learning setup is the level of competence of the students' problem-solving skills. The sudden shift of the educational process brings many vulnerabilities, both to teachers and students. Nowadays, problem-solving methods are regarded as essential factors for students' increased level of mathematics achievement. Also, problem-solving methods can decipher problems and situations that emerge in real-life contexts. Knowles et al. (1998), as cited in Harmon S.B (2000), stated that much of the emphasis in individual differences research is based on how learning professionals should change their facilitation and leadership styles to make learning more engaging and exciting for students.

In the Philippines, educational institutions make sure that the teaching and learning process continues despite the pandemic and opt to use online modes to deliver instructions that will foster the students' mathematical skills. The Higher Education Commission has mandated flexible learning, which includes a mix of digital and non-digital technologies. Flexible learning in higher education ensures the stability of inclusive and accessible education where conventional modes of education cannot be used, such as during a national emergency (Magsambol B. 2020). Hodges et al. (2020) stressed that coping with the sudden and rapid shift to remote learning would abruptly change the competencies taught to the students.

Cebu Technological University- Argao Campus, one of the top-performing universities in the country, adopted online learning in the first semester of the Academic year 2020-2021 and used different mathematical tools to foster learning. Furthermore, the researchers wanted to know how the students dwell in their studies in online learning despite the circumstances they currently experience. Driven by curiosity and motivation, the researchers wanted to know the perceived level of competence of the BSEd-Math students' problem-solving skills in mathematics in the new normal of Cebu Technological University-Argao Campus for the academic year 2020-2021.

This study assisted researchers in identifying opportunities, interventions, and practical actions that could be recommended for better teaching designs and pedagogical approaches in new normal education and for developing and improving students' problem-solving skills in mathematics.

3. METHODOLOGY

The study used a descriptive quantitative research design using an adapted questionnaire to determine the perceived level of competence of the BSED Math Students' problem solving skills in Mathematics in the new normal in Cebu Technological University- Argao Campus. The researchers used a simple-stratified sampling to get 60 respondents out of 106 BSEd-Mathematics students, which was chosen randomly. Also, the researchers randomly selected 20 respondents at each year level. Moreover, the main instruments used for gathering data were a questionnaire adapted from Problem-solving Style Questionnaire by Ranganath Pandit (2011), Mathematical Problem-solving Strategies among student teachers by Melanie Guzman Gurat (2018), Mathematical problem-solving skills using IDEAL model based on personality type by T.Y. Setyadi et al. (2019) and Perception of Blended Learning in an EFL Setting by Ersin Balci (2017). Descriptive analysis was utilized using frequency count, simple percentage, and weighted mean.



Figure 1: Map showing the Cebu Technological University-Argao Campus, Cebu, Philippines

(https://en.wikipedia.org/wiki/Argao#/media/File:Ph_locator_cebu_argao.png ,

https://web.facebook.com/101148845151482/posts/the-facade-of-ctu-argao-campus/101400128459687/?_rdc=1&_rdr)

4. RESULTS AND DISCUSSION

4.1 Demographic Profile of the Respondents

4.1.1 Respondents' Age

Table 1 presents the age profile of the Bachelor of Secondary Education Major in Mathematics students of Cebu Technological University- Argao Campus in the academic year 2020-2021.

As shown in table 1, among the 60 respondents, 40 (66.67%) of the respondents belonged to the age bracket ranging from 18-20 years old, 18 (30.00%) of them were within the 21-23 years old, and 2 (3.33%) respondents were at the age of 24 years old and above. Thus, the average age of the BSEd- Mathematics was 20 years old. It was evident in the data presented that the age bracket with the highest percentage is at the age bracket ranging from 18-20 years old, and the age bracket with the lowest rate is 24 years old and above. The result implies that most of the respondents are from the age bracket ranging from 18-to 20 years old to which the average age belonged.

Table 1: Respondents' Age

Age	(f)	%
24 and above	2	3.33
21-23	18	30.00
18-20	40	66.67
Total	60	100.00
Average Age	20	

It was supported by Sedra Spano (2004) in his article about "Stages of Adolescent Development" research facts and findings that ages below 21 are classified as late adolescents with the ability to think and express ideas, ability to make

independent decisions, ability to be self-reliant, and ability to compromise. Also, most individuals are more defined on work habits, more profound concern for the future, and thoughts about one's role in life. Furthermore, the result suggests that the respondents know how capable they are in terms of their problem-solving skills perceived level of competence in Mathematics in the new normal.

4.1.2 Respondents' Gender

Table 2 unveils the gender profile of the Bachelor of Secondary Education Major in Mathematics students of Cebu Technological University- Argao Campus in the academic year 2020-2021.

Table 2: Respondents' Gender						
Year Level	Gender				Total	
	Male		Female			
	f	%	f	%	f	%
Third	5	8.33	15	25.00	20	33.33
Second	6	10.00	14	23.33	20	33.33
First	2	3.33	18	30.00	20	33.33
Total	13	21.67	47	78.33	60	100.00

As reflected in table 2, sixty students were part of the study, 13 out of 60 respondents were male, and 47 out of 60 were female. The table shows that 21.67% of the respondents were male, and 78.33% were female. Thus, in the study, females were the most respondents compared to males. There are more female BSEd-Mathematics students than males in Cebu Technological University-Argao Campus.

This result was supported by OECD (2017) in their study about gender imbalances in the teaching profession, that among nations, females have primarily dominated the teaching profession. For all levels of education combined, the percentage of female teachers has risen steadily over the last decade, reaching 68 % in 2014. With increasing levels of education, the gender gap narrows, from 97 % of women in pre-primary to 43 % in tertiary education. The gender gap widened at the primary and secondary levels between 2005 and 2014, but narrowed at the tertiary level. It can be concluded that teaching as a profession was totally controlled by females compared to males.

4.2 Perceived Level of Competence of the Respondents' Problem-Solving Skills in Learning Mathematics

4.2.1 Respondents' Perceived Level of Competence in Problem Solving Skills in Terms of Creative Thinking

Creative thinking is the innovative transformation of thinking that involves critical thinking to unravel things in every challenge. It also involves thinking outside the box (Harris and Robert, 2016). This study indicates the respondents' creative thinking skills in solving mathematical problems and better apprehends the different unique ways in problem solving. Furthermore, it cultivates the ability of the respondents to solve problems through thinking creatively in mathematics. Table 3 presents the data of the respondents' perceived level of competence in problem solving skills in terms of creative thinking.

Table 3: Respondents' Perceived Level of Competence in Problem Solving Skills in Terms of Creative Thinking

Statements		WM	Categorical Response	Verbal Description
1	I make charts and tables to help me in finding answers on problems.	3.68	Frequently true of me	Competent
2	I can create my own formula on the given mathematical problem.	3.18	True of me about half of the time	Not so competent
3	I try to find out another efficient way to solve the problem when I hear some ideas or some solutions.	4.12	Frequently true of me	Competent
4	Once I choose a solution, I develop an implementation plan with the sequence of events necessary for completion.	3.75	Frequently true of me	Competent
5	I make a drawing related to the problem.	3.58	Frequently true of me	Competent
GRAND MEAN		3.66	Frequently true of me	Competent

As shown in table 3, the statement 3 “I try to find out another efficient way to solve the problem when I hear some ideas or some solutions” got the highest weighted mean of 4.12 while the statement 2 “I can create my own formula on the given mathematical problem” has the lowest weighted mean of 3.18. In creative thinking category, the grand mean for the statements pertaining to the respondents' perceived level of competence in problem solving skills in terms of creative thinking is 3.66 which means that it is frequently true to the respondents and they are competent in that area.

The results yields that students are skilled in finding another efficient way in solving mathematical problems when they hear inputs or solutions from others as well they are competent in learning mathematics in their own unique ways. However, students are not so skilled in terms making their own conjectures in problem solving but it is true on them in some ways. In general, this implies that respondents were able to utilize creative thinking in problem-solving skills in learning mathematics despite of the difficulty they currently experience in the new normal set-up of education and they were able to portray innovativeness in their studies.

According to Munandar (2002) as cited by Ranak Lince (2016) that Students' creative thinking abilities can be tested in a variety of ways such as being a flexible thinker which includes the ability to come up unique ideas, provide a variety of answers, complete tasks using various of methods, provide examples related to the concept, and find alternative solutions to a variety of circumstances and problems.

4.2.2 Respondents' Perceived Level of Competence in Problem Solving Skills in Terms of Analysis

Analysis is the process of breaking a complex topic or substance into smaller parts in order to gain a better understanding of it (Richard Hensley, 2016). In the study, it demonstrates the skill in analyzing mathematical problem and creates a better way of understanding the problem in order to have a specific solution. The learners study a situation or problem in order to gain a better understanding of it and to propose practical solutions for resolving it. This ability is very applicable in the real life situation whenever individuals are to decide or to find information. The table 4 gives the data on analysis.

Table 4: Respondents' Perceived Level of Competence in Problem Solving Skills in Terms of Analysis

Statements		WM	Categorical Response	Verbal Description
1	I check my calculations by calculating again.	4.43	Always or almost always true to me	Very Competent
2	I reorganize and clarify the confused points after class.	4.12	Frequently true of me	Competent
3	I select relevant steps to solve the problem.	4.10	Frequently true of me	Competent
4	I evaluate potential solutions carefully and thoroughly against a predefined standard.	3.75	Frequently true of me	Competent
5	When evaluating solutions, I take time to think about how I should between options.	3.60	Frequently true of me	Competent
GRAND MEAN		4.00	Frequently true of me	Competent

As shown in table 4, the statement 1 “I check my calculations by calculating again” got the highest weighted mean of 4.43. On the other hand, the statement 5 “when evaluating solutions, I take time to think about how I should between options” obtained the lowest weighted mean of 3.60. The grand mean on the respondents’ perceived level of competence problem solving skills in term of analysis is 4.00. Connectedly, most of the students are competent to those statements which mean that they possess such skills and actions related to analysis and also it shows that it is frequently true to the students.

This implies that students have good analytical skills in which they used it accordingly based on the results from the presented data. Also, it implies that having such skill could be a great help for BSEd-Mathematics students in learning mathematics in the new normal. According Dr. Jerald C. Moneza et al (2020) on his study about Problem Solving Attitude and Critical Thinking Ability of Students that students who enhance analysis, find for practicable solutions in a given problem or situation and think critically can maximize their academic performance and problem-solving skills in mathematics as well as make them better ready to fulfil the educational standards. Hence, the ability to think critically is vital for students in managing and solving problems they may encounter.

4.2.3 Respondents' perceived Level of Competence in Problem Solving Skills in Terms Of Decision Making

Decision Making is the method of constructing choices by distinguishing a decision, acquiring information and evaluating alternative resolutions (Suraj P., 2019). In the study, it is the students’ ability in making use of substantial decisions which requires creativity in identifying and developing options or solutions to problems for which the brainstorming techniques are particularly useful. It is their ability to make a similar discovery, careful identification and evaluation of alternatives in the process of problem solving in mathematics. Table 5 presents the data about respondents’ perceived level of competence in problem solving skills in terms of decision making.

Table 5: Respondents' Perceived Level of Competence in Problem Solving Skills in terms of Decision Making

	Statements	WM	Categorical Response	Verbal Description
1	I usually question what I heard or what I learned in math class, and judge if this information is persuasive.	3.75	Frequently true of me	Competent
2	I make final decision in the end of my problem-solving process.	4.03	Frequently true of me	Competent
3	I modify whether my decisions are working and promptly modify them as needed.	4.02	Frequently true of me	Competent
4	I select relevant materials to solve the problem.	4.20	Frequently true of me	Competent
5	I take time to decide and design an action plan before actually calculating.	3.98	Frequently true of me	Competent
	GRAND MEAN	4.00	Frequently true of me	Competent

As presented in table 5, the statement that has the largest weighted mean of 4.20 among the five is the statement 4 which states that "I select relevant materials to solve problem". However, the statement 1 "I usually question what I heard or what I learned in math class and judge if this information is persuasive" got the lowest weighted mean of 3.75. Decision making category obtained a grand mean of 4.00 which means that students are competent with the statements pertaining to their perceived level of competence in problem solving skills in terms of decision making.

The results yields that most students have the capability in deciding what is good for their studies particularly in selecting the most relevant things related to mathematics as well as they possess good judgment skills. As a whole, the result implies that students are having a good decision making and they used it well in learning problem solving skill in mathematics in the new normal.

According to Cindy Dietrich (2010) that decision making helps enrich competences of students' problem solving skills. This also improves their understanding process by which every student makes their decisions to understand the choices they make. Moreover, problem-solving, in a wider process, decision making involves choosing between possible solutions to a problem. Students made their decisions through intuitive or reasoned process, or sometimes a combination of the two.

4.2.4 Respondents' Perceived Level of Competence in Problem Solving Skills in Terms of Emotional Intelligence

Emotional intelligence is defined as the ability to recognize, control, and express one's emotions, as well as the ability to manage interpersonal relationships wisely and humanely (Ghosh A., 2020). In the study, it indicates the ability of the students to identify and define a problem as well as to generate and implement potentially effective solutions where emotions are involved. In short, it refers to the process of effectively resolving personal and interpersonal issues. It includes the ability to understand how emotions impact decision making and student's capability of balancing the intellectual and emotional manner while facing the problems in mathematics. Table 6 unveils the data of the Respondents' Perceived Level of Competence in Problem Solving Skills in terms of Emotional Intelligence.

Table 6: Respondents' Perceived Level of Competence in Problem Solving Skills in terms of Emotional Intelligence

Statements		WM	Categorical Response	Verbal Description
1	I do not experience mental breakdown especially when I got low scores on quizzes and activities.	2.88	True of me about half of the time	Not so Competent
2	I reflect on the answer only if all is checked giving a clear, exact and precise answer	3.77	Frequently true of me	Competent
3	I don't let problems upset me, no matter how difficult they are.	3.50	Frequently true of me	Competent
4	I am confident with my answer because I have all the solution to the problem.	3.32	True of me about half of the time	Not so Competent
5	When answering a problem in mathematics, I follow my instincts that my answers are correct.	3.70	Frequently true of me	Competent
GRAND MEAN		3.43	Frequently true of me	Competent

As projected in table 6, it shows that the statement 2 “I reflect on my answer only if all is checked giving a clear, exact and precise answer” has the highest weighted mean of 3.77 among the five statements that belong to the emotional category. On the other hand, the statement 1 “I do not experience mental breakdown especially when I got low scores on quizzes and activities” has the lowest weighted mean of 2.88. Based on the gathered result, the emotional intelligence category has a grand mean of 3.43 which means that most respondents are competent to the statements pertaining to the perceived level of competence in problem solving skills in terms of emotional intelligence.

The result shows that students are having positive attitudes towards mathematics if they apply emotional skills in their studies as well as if they reflect on their actions. However, students are not so competent sometimes when they experienced mental breakdown in learning mathematics. Yet, in general, the result implies that the students are capable in dealing with their emotional issues in learning mathematics in the new normal, they were able to show competence in this skill and able to apply it their learning and studies.

According to Sri Maryani (2019) on his study about “The effects of Emotional Intelligence on Students' Mathematical Problem-solving ability” that because emotional intelligence plays a role in student success in college and the broader environment, it is prudent for universities, particularly teacher educators, to incorporate elements of emotional intelligence in delivering material and involving students' talents in the learning process. For learners, it is expected to motivate themselves so they can improve their ability to solve mathematical problems optimally. This means that the emotional aspect of the students does not greatly affect the level of competence of the BSEd-Math students in learning mathematics.

4.2.5 Respondents' Perceived Level of Competence in Problem Solving Skills in Terms of Researching Skills

Researching skills are the ability to seek out solutions to a question or answers to a problem. The ability to gather information about a topic, review the knowledge, and analyze and interpret the knowledge in a way that leads students to the answer they require is embodied by research skills (Indeed Editorial Team, 2021). Also, it is the ability of individuals or students in particular in making use of resources they have or they want to find answers to a problem specifically in mathematics. Table 7 presents the data of the respondents' perceived level of competence in problem solving skills in terms of researching skills.

Table 7: Respondents' Perceived Level of Competence in Problem Solving Skills in terms of Researching Skills

Statements		WM	Categorical Response	Verbal Description
1	I try to find out another efficient way to solve the problem from books and internet sources	4.25	Always or almost always true to me	Very Competent
2	I select relevant materials to solve the problem.	4.22	Always or almost always true to me	Very Competent
3	I do look for other solution to the problem to have options.	4.00	Frequently true of me	Competent
4	I acquire knowledge through online research or courses.	4.07	Frequently true of me	Competent
5	I consult more experienced colleagues in mathematics.	3.90	Frequently true of me	Competent
GRAND MEAN		4.09	Frequently true of me	Competent

As reflected in table 7, the statement 1 “I try to find out another efficient way to solve the problem from book and internet sources” has the highest weighted mean of 4.25 which has a verbal description of ‘very competent’ while the lowest weighted mean is 3.90 on the statement 5, “I consult more experienced colleagues in mathematics” with a verbal description of “competent”. The grand mean of the given data is 4.09 which imply that the students are competent with the statements related to researching skills. Also, students show the ability of being resourceful.

The result shows that students are good in finding reliable resources that would help their learning as well as they portrayed the ability of being initiative and resourceful. Generally, result implies that it is evident in this category that students show competence in this skill. Additionally, they are more active and very involve in the class as well they are creative in looking related data and information about their lessons in mathematics in the new normal set-up of learning.

According to the study of Jagoda Topalov (2013) about “Academic Research Skills of University Students” that students must be aware of a range of sources of information like university libraries, virtual and digital libraries and other online sources to be able to identify the strengths and weaknesses of different sources and be able to record bibliographic information for books, volumes, articles and internet sites used during the preparation and research process. Additionally, in the study of Eleni Miltsakaki (2012) about “A study of research skills as demonstrated in a record of search behaviour on the internet”, it states that by engaging students in inquiry-based tasks which in turn, involves engaging students in academic style research such as making an inquiry, seeking information in multiple sources, evaluating the validity of the sources, and analyzing the data to address the inquiry or solve a problem.

4.2.6 Respondents' Perceived Level of Competence in Problem Solving Skills in Terms of Team Working

Teamwork skills are the qualities and abilities that allow individuals to work well with others during conversations, projects, meetings or other collaborations (Indeed Editorial Team, 2020). In the study, it was the ability of the students in solving mathematical problems while working within a group. It is the ability to analyze and interpret more data about a problem from the suggestions or opinion of the group. Team working also demonstrates social skills of the students and uses it to gather information to attain the desired solutions. Table 8 presents the data on team working skills.

Table 8: Respondents' Perceived Level of Competence in Problem Solving Skills in Terms of Team Working

Statements		WM	Categorical Response	Verbal Description
1	I show great skills in mathematics and abilities to be resourceful in a team and uses available resources to achieve the highest possible result.	3.57	Frequently true of me	Competent
2	I will gather more information about the problem by brainstorming with other team members.	4.08	Frequently true of me	Competent
3	I drive team-related work and activities in mathematics forward and ensure task are handled to completion	3.75	Frequently true of me	Competent
4	I participate actively in all mathematics activity in our group and displays positive attitude.	3.95	Frequently true of me	Competent
5	I offer workable solutions to the various problems we encountered in mathematics and ideas being faced by the team.	3.80	Frequently true of me	Competent
GRAND MEAN		3.83	Frequently true of me	Competent

As shown in table 8, the statement 2 “I will gather more information about the problem by brainstorming with other team member” obtained the highest weighted mean of 4.08. On the other hand, the statement 1 “I show great skills in mathematics and abilities to be resourceful in a team and uses available resources to achieve the highest possible result” has the lowest weighted mean of 3.57 among the five statement of respondents’ perceived level of competence in problem solving skills in terms of team working skills. In team working category, the grand mean is 3.83. Similarly, most of the respondents are competent which means that they possess team working skills frequently in learning mathematics in the new normal.

The results yield that the students learn best if they are collaboratively and actively working in a group or in a team as well as when they share different ideas and tasks within the group. Generally, this category implies that students have shown competence in this skill and they were able to display it in their studies particularly in mathematics. In addition, it also implies that the level of competence of the students in learning mathematics works best if they are engage in group activity or team task.

According to Mohd Azmir et al, (2016) in their study “The Impact of Teamwork Skills on Students in Malaysian Public Universities”, teamwork skills could help to improve the added-values on students, build their self-esteem and help to improve their communication skills and interaction with the others. Furthermore, their study exposed that the implication of teamwork skills on the students could expose and help them to develop critical and creative thinking, to solve problems related to their tasks and enhance the quality of learning practice and process. Their study suggests that the implementation of cooperation competency and as ability should be included along with the other prescribed soft skills with varied learner-centered activities. In addition, this was also supported by the Collaborative learning theory of Lev Vygotsky’s idea, Zone of Proximal Development. The theory suggests that cluster learning encourage students to develop higher-level thinking, verbal communication, self-management, and leadership ability. Learners rely on one another to accomplish task that they have otherwise they would not be able to complete individually (Kelly, 2017) as cited by Mohd Azmir et al, (2016).

4.3 Summary Table for the Respondents' Perceived Level of Competence in Problem Solving Skills

Table 9 presents the summary table of the Bachelor of Secondary Education Major in Mathematics students' problem solving skills in mathematics of Cebu Technological University- Argao Campus in the Academic Year 2020-2021 that was divided into 6 categories namely: Creative Thinking, Analysis, Decision Making, Emotional Intelligence, Researching Skills and Team Working.

Table 9: Summary Table for the Respondents' Perceived Level of Competence in Problem Solving Skills

Problem Solving Skills	WM	Categorical Response	Verbal Description
Creative Thinking	3.66	Frequently true of me	Competent
Analysis	4.00	Frequently true of me	Competent
Decision Making	4.00	Frequently true of me	Competent
Emotional Intelligence	3.43	Frequently true of me	Competent
Researching Skills	4.09	Frequently true of me	Competent
Team working	3.83	Frequently true of me	Competent
GRAND MEAN	3.84	Frequently true of me	Competent

As shown in table 9, it shows that among the 6 categories of problem-solving, researching skills got the highest weighted mean of 4.09 with a verbal description of competent which means that it is frequently true to respondents and it is the most preferred and used skill by the BSEd-Mathematics students in learning problem solving skills in mathematics in the new normal. On the other hand, the emotional intelligence category obtained the lowest weighted mean with 3.43 among the 6 categories of problem-solving skills which is competent and denotes that it is frequently true to the students and most them used emotional intelligence in learning problem-solving skills in mathematics as well. Moreover, the respondents' problem-solving skills in Mathematics in the new normal obtained an average mean of 3.84 which means that the students are competent with the 6 categories pertaining to the perceived level of competence in problem solving skills in mathematics and also, it means that it is frequently true among students.

As a whole, the result implies that students shown and portrayed competence on the 6 categories of the perceived level of competence in problem solving skills in mathematics as well as they were able to apply and adjust in their studies despite of the difficulties they experienced throughout their learning in the new normal set up of education.

It was supported by cognitive development theory of Piaget as cited by Muhammad S. M. et al (2019) that cognitive methods continue to be a part of the educational system and the usage of this theory in teaching mathematics can be seen in the skill of problem solving for it helps increase performance, competence and reasoning skills among students and may give valuable impacts in the future in which they can use in solving real life problems. Therefore, problem solving methods as one of the skills that can be taught in mathematics are considered as essential factors to increase the level of students' mathematics achievement.

4.4 Problems Met by the Respondents in Learning Mathematics in the New Normal

The following table 10 presents the problems/challenges met by the Bachelor of Secondary Education Major in Mathematics students in learning mathematics in the new normal of Cebu Technological University- Argao Campus in the Academic Year 2020-2021.

As reflected in table 10, it shows that the statement 1 “I do not easily understand the concept of the lesson being discussed by the teacher online” has the highest weighted mean of 3.88 which means that students always encounter the problem as well as it means that students have a difficulty in understanding the concept most especially if it is not discuss by the teacher prior to the activities or quizzes. Also, statement 6 “My focus on learning with mathematics will be disturbed if the environment is not appropriate.” got a weighted mean of 3.43 which means that environment is a big factor in their learning in mathematics.

However, the statement 13 “I always depend on my classmates answer whenever we have a group activity instead of giving my own opinion” has the lowest weighted mean of 1.67 which means that most of the students do not encounter the problem and they are independent and can do answering by their own without asking help from their group mates. Additionally, statement 8 “I easily give up if I do not know how to answer the given activities instead, I will chat with my friends and ask for answers without asking how they solve for the answers.” obtained a weighted mean of 2.02 which means that students encounter such thing sometimes.

Subsequently, the grand mean of the statements pertaining to the problems met by students in learning mathematics in the new normal is 2.67 which mean they often face and experience the problems. This implies that students learning in mathematics were affected by different problems for they encounter troubles often yet the level of competence of the students in learning mathematics in the new normal is still very high for they can adapt to the situation easily in some ways and they showed competence based on the data obtained. Moreover, it also implies that there are factors affecting how they learn mathematics like the way the teachers teach the learners or the context that they are in, especially now that the students are just in their homes.

Table 10: Problems Met by the Respondents in Learning Mathematics in the New Normal

Statements		WM	Categorical Response
1.	I do not easily understand the concept of the lesson being discussed by the teacher online.	3.88	Always
2.	I felt pressured even if I am learning at home.	2.97	Often
3.	I find difficulty in learning mathematics since I am only learning in my own pace.	2.73	Often
4.	I get anxious when I get low scores in exams and quizzes using online educational platforms.	2.78	Often
5.	I am having a weak internet connection which will lose my urge for focusing during discussion.	3.13	Often
6.	My focus on learning with mathematics will be disturbed if the environment is not appropriate.	3.43	Always
7.	I skip or even did not listen to the virtual discussion of our teacher instead I do some unrelated activities.	2.00	Sometimes
8.	I easily give up if I do not know how to answer the given activities instead; I will chat my friends and ask for answers without asking how they solve for the answers.	2.02	Sometimes
9.	With the new normal set-up, I experienced math anxiety especially when we will have quizzes with limited time allotment.	2.98	Often
10.	I experienced mental breakdown especially when I got low scores on quizzes and activities.	2.45	Sometimes
11.	Mathematics makes me confused and it is so hard to understand the concept during discussion since the face of my teacher is blurry during instruction.	2.43	Sometimes
12.	I cannot attend synchronous class due to connection inefficiency.	2.45	Sometimes

13.	I always depend on my classmates answer whenever we have a group activity instead of giving my own opinion.	1.67	Never
14.	I am interrupted while having synchronous class due to the chores I have to do at home while the class is going on.	2.43	Sometimes
15.	I experienced limited resources regarding to mathematics lesson especially online.	2.68	Often
GRAND MEAN		2.67	Often

Furthermore, according to the Cognitive Theory of Jean Piaget as cited by (Mingke and Alegre, 2019) in their study about “Difficulties Encountered in Mathematical Problem-solving of the Grade Six Learners” mentioned that the ability to solve mathematical problems and reading comprehension skills could be the difficulties of pupils to solve mathematical problems. For instance, solving problems in a different context require mental representation of the problem and simple mathematical things will turn to complex one. In addition, it stressed that students need to apply cognitive strategies of goal and sequences of mental operation in order to learn and solved word problems as well as challenges encountered. And educators should adjust their instructional approaches and practices according to the different pre-skills that the learners have because these pre-skills play an important role in solving mathematical problems in which when learners earn more theoretical and procedural competence and skills in mathematics, they become more competent and capable in learning mathematics.

5. CONCLUSIONS

Based on the findings of the study, the students showed competence on their perceived level of competence in problem solving skills in mathematics in the new normal and these six (6) categories of problem solving skills were displayed and applied by them in learning mathematics and having these skills are very vital in the new normal. On the other hand, results also showed that students often faced such problems in learning mathematics. Thus, it can be concluded that BSEd-Math students learning in mathematics were affected by different issues for they met challenges often, yet the level of competence of the students in learning mathematics in the new normal was still competent and soaring for they could adjust to the different circumstances in some ways.

Moreover, the findings of the study revealed that the perceived level of competence of the Bachelor of Secondary Education Major in Mathematics students' problem-solving skills in mathematics in the new normal supported the related learning theories of education such as the Cognitive Development Theory of Jean Piaget (1936) as cited by Abdolreza Lessani, et al (2016), Constructivism Learning Theory and the Theory and Practice of Online Learning by (T. Anderson 2008). Thus, this study agreed on the three theories anchored.

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7. REFERENCES

1. Abdolreza Lessani, et. al (2016). *Comparison of Learning Theories in Mathematics Teaching Methods*. Vol.9, No.1 ISSN:2330-1236. Retrieved from https://www.21caf.org/uploads/1/3/5/2/13527682/14hrd-4111_lessani.pdf
2. Anderson T. (2008). *The Theory and Practice of Online learning*. Second Edition. AU Press, Athabasca University. ISBN 978-1-897425-08-4. Retrieved from <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.131.9849&rep=rep1&type=pdf>
3. Balci E. (2017). *Perception of Blended Learning in an EFL Setting*. Retrieved from http://languageresearch.cambridge.org/images/pdf/Final-report_TRP_CUP_2016_Balci.pdf
4. Cindy Dietrich (2010). *Decision Making: Factors that Influence Decision Making, Heuristics Used, and Decision Outcomes*. Vol. 2. No.02. Retrieved from http://www.inquiriesjournal.com/articles/180/3/decision-making-factors-that-influence-decision-making-heuristics-used-and-decision-outcomes?fbclid=IwAR07zBR5Y_hAW4wwXwbcNdb7OhTq6WadbvlsFX3gqPh0cvCuIJ0HnH1WdMQ#header5page3
5. Dr. Jerald Moneva (2020). *PROBLEM SOLVING ATTITUDE AND CRITICAL THINKING ABILITY OF STUDENTS*. *International Journal of Research -GRANTHAALAYAH* 8(1): DOI:10.29121/granthaalayah.v8.i1.2020.261.138-149. Retrieved from https://www.researchgate.net/publication/341916017_PROBLEM_SOLVING_ATTITUDE_AND_CRITICAL_THINKING_ABILITY_OF_STUDENTS
6. Eleni Miltsakaki (2012). *A study of research skills as demonstrated in a record of search behavior on the internet*. *Conference: Society of Information Technology and Teacher Education (SITE)*. Retrieved from https://www.researchgate.net/publication/259669017_A_study_of_students'_research_skills_as_demonstrated_in_a_record_of_search_behavior_on_the_internet
7. Ghosh A. (2020). *Definition of Emotional Intelligence*. Retrieved from <https://techieghosh.in/2020/05/emotional-intelligence/>
8. Harmon S.B. (2000). *CHAPTER II REVIEW OF RELATED LITERATURE*. Retrieved from <https://vtechworks.lib.vt.edu/bitstream/handle/10919/27353/Chapter2.pdf?sequence=1>
9. Harris and Robert (2016). *"Introduction to Creative Thinking"*. *Virtual Salt*. Retrieved from <https://courses.lumenlearning.com/suny-collegesuccess-lumen1/chapter/creative-thinking-skills/>
10. Hodges, et. al (2020). *The Difference Between Emergency Remote Teaching and Online Learning*. March 27, 2020. Retrieved from <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
11. Indeed Editorial Team (2020). *Teamwork Skills: Definition and Examples*. Retrieved from <https://www.indeed.com/career-advice/career-development/teamwork-skills#:~:text=Teamwork%20skills%20are%20the%20qualities,and%20be%20responsible%20and%20honest>
12. Indeed Editorial Team (2021). *Research Skills: Definition and Examples*. Retrieved from <https://www.indeed.com/career-advice/career-development/research-skills>
13. Jagoda Topalov (2013). *Academic Research Skills of University Students*. *Romanian Journal of English Studies* 10(1). DOI:10.2478/rjes-2013-0012. Retrieved from https://www.researchgate.net/publication/311778698_Academic_Research_Skills_of_University_Students

14. Magsambol B. (2020). *Fast Facts: CHED's Flexible Learning*. Retrieved from <https://www.rappler.com/newsbreak/iq/things-to-know-ched-flexible-learning>
15. Melanie Guzman Gurat (2018). *Mathematical Problem-solving Strategies among Student Teachers*. *ERIES Journal* vol. 11 no. 3. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1208772.pdf>
16. Mingke and Alegre (2019). *Difficulties Encountered in Mathematical Problem-solving of the Grade Six Learners*. *International Journal of Scientific and Research Publications (IJSRP)* 9(6):p9053. DOI:10.29322/IJSRP.9.06.2019.p9053. Retrieved from https://www.researchgate.net/publication/334187866_Difficulties_Encountered_In_Mathematical_Word_Problem_Solving_Of_The_Grade_Six_Learners
17. Mohd Azmiret al, (2016). *The Impact of Teamwork skills on Students in Malaysian Public Universities*. Avilion Hotel Melaka, Malaysia. *International Conference on Humanities and Technology*. Retrieved from https://www.researchgate.net/publication/306229244_The_Impact_of_Teamwork_skills_on_Students_in_Malaysian_Public_Universities
18. Muhammad S. M. et al (2019). *Justification on the Selection of Revised Edition Of Bloom's Taxonomy in the Levels of Oral Questioning in the Process of Teaching Mathematic in Malaysia*. *International Journal of Innovative Technology and Exploring Engineering*. DOI: 10.35940/ijitee.L1106.10812S219.586-592. Retrieved from https://www.researchgate.net/publication/338371657_Justification_on_the_Selection_of_Revised_Edition_of_Bloom's_Taxonomy_in_the_Levels_of_Oral_Questioning_in_the_Process_of_Teaching_Mathematic_in_Malaysia
19. OECD (2017). "Gender imbalances in the teaching profession". *Education Indicators in Focus*. No. 49. OECD Publishing, Paris. Retrieved from https://www.oecd-ilibrary.org/education/gender-imbalances-in-the-teaching-profession_54f0ef95-en
<https://ideas.repec.org/p/oec/eduaaf/49-en.html>
20. Ranak Lince (2016). *Creative Thinking Ability to Increase Student Mathematical of Junior High School by Applying Models Numbered Heads Together*. *Journal of Education and Practice* www.iiste.org ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol.7, No.6. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1092494.pdf>
21. Ranganath Pandit (2011). *Problem-solving Style Questionnaire*. Retrieved from <https://www.scribd.com/doc/67905634/Problem-Solving-Style-Questionnaire>
22. Richard Hensley (2016). *Analysis Analysis is the process of breaking a complex topic or substance into smaller parts to gain a better understanding*. Retrieved from <https://slideplayer.com/slide/7638397/>
23. Sedra S. (2004). *Stages of Adolescents Development*. A publication of the ACT for Youth Center of Excellence. Retrieved from https://www.actforyouth.net/resources/rf/rf_stages_0504.cfm?fbclid=IwAR1UDK_t-zbr0yudNb1quEIMf3B8aVyA2fq04ArKIKdtYsxJV9wTjtEbYAs
24. Setyadi et.al (2019). *Mathematical problem-solving skills using IDEAL model based on personality type of T.Y*. *AIP Conference Proceedings* 2194, 020115 (2019); Retrieved from <https://doi.org/10.1063/1.5139847>.
<https://aip.scitation.org/doi/10.1063/1.5139847>
25. Sri Maryani (2019). *The Effects of Emotional Intelligence on Students' Mathematical Problem Solving Ability*. *International Journal of Multicultural and Multireligious Understanding* 6(5):912 DOI:10.18415/ijmmu.v6i5.1164. Retrieved from https://www.researchgate.net/publication/338053526_The_Effects_of_Emotional_Intelligence_on_Students'_Mathematical_Problem_Solving_Ability
26. Suraj P. (2019). *To Study the Decision Making Process in an Organization for its Effectiveness*. *The International Journal of*

Business Management and Technology, Volume 3 Issue 1 January - February 2019 ISSN: 2581-3889. Retrieved from <https://www.theijbmt.com/archive/0925/2143635892.pdf>

27. Teach Thought Staff (2012). *The Definition Of Blended Learning*. Retrieved from <https://www.teachthought.com/learning/the-definition-of-blended-learning/>
28. Ramesh, S., H. Samuel Thavaraj, and D. Ramkumar. "Impact of emotional intelligence on academic achievements of college students—a review." *International Journal of Business Management & Research (IJBMR)* 6.2 (2016): 25-30.
29. Anand, D. S., et al. "Analysis of emotional intelligence of bank employees in Dehradun district: a comparative study of private and public sector banks." *International Journal of Human Resource Management and Research* 9.3 (2019): 97-106.
30. Opuni, Frank Frimpong, and K. W. A. M. E. Adu-Gyamfi. "An analysis of the impact of emotional intelligence on service quality and customer satisfaction in the telecommunication sector in Ghana." *International Journal of Sales & Marketing Management Research and Development* 4.3 (2014): 11-26.
31. Danquah, E. M. E. L. I. A., and Theophilus B. Wireko. "The impact of each element of emotional intelligence on customer service delivery: A customer satisfaction perspective." *International Journal of Sales & Marketing Management Research and Development* 4.2 (2014): 9-20.